SDMS US EPA REGION V -1

SOME IMAGES WITHIN THIS DOCUMENT MAY BE ILLEGIBLE DUE TO BAD SOURCE DOCUMENTS.

163932

Monsanto

COMPANY CONFIDENTIAL

FROM (NAME & LOCATION) M. R. Foreman - Krummrich

DATE October 9, 1970

SUBJECT POTENTIAL METALLIC POLLUTANTS - W. G. KRUMMRICH PLANT

REFERENCE P.B.Hodges 9/14/70 "Heavy Metals into Environment"

TO : Paul B. Hodges

cc [redacted] Jackson
Beaudine
Buckley

Potential Metallic Pollutant, Oct. 9, 1970

In response to your letter dated 9/14/70 concerning heavy metals into the environment, the pollution control department at the WGK Plant has conducted a survey of each department and related product to determine possible metallic pollutants and the amount of these heavy metals released to the environment each year. Data collected from this survey has been organized into six separate groups as follows:

I. PRODUCTS SOLD

All products produced at WGK were surveyed for possible heavy metal contamination or composition. Table I is a listing of products produced at WGK which contain metallic elements. The metallic content is given as a percent or PPM of the product sold.

II. RAW MATERIALS & INTERMEDIATES

Table II is a complete list of all raw materials and intermediates used at WGK which are themselves metallic compounds or contain trace quantities of heavy metals.

III. PRODUCTS & MATERIALS HAULED TO LANDFILL

Table III lists all of the materials which contain metallic elements and are hauled to the WGK Sanitary Landfill located in Sauget, Illinois. This landfill is used also by the JFQ Plant and the research facility at the general offices, and has for some time been a source of ground water contamination due to percolation of the waste materials.

IV. PRODUCTS & MATERIALS SEWERED

Sewer losses of heavy metals at WGK vary greatly from day to day depending on the operation of particular departments. Table IV is an estimate of yearly losses of heavy metals sewered during 1970. The figure for the total

CER 130539

IV. PRODUCTS & MATERIALS SEWERED (continued)

amount of Hg sewered during 1970 is based on the assumption that the Hg losses will be greatly reduced for the remainder of the year. This reduction will be the result of the successful operation of the Hooker clarifier and sulfide treatment on Department 231's caustic effluent. As will cease being sewered from Department 250 in the first quarter of 1971 with the discontinuance of the H_3PO_4 filtration operation.

V. AIR EMISSIONS

The only known source of heavy metal air emissions at the WGK Plant is the mercury vapors released in the production of chlorine. These vapors were monitored between August 11 and August 20 at various locations within the plant with the results being as tabulated in Table V. Some of the readings were probably effected by the presence of solvent vapors and SO_2 found in heavy concentrations in some areas of the plant. At the present time we are working on a better method for measuring Hg vapor losses from the Chlorine Department, and the results from this work will be reported on, or before, 12/31/70.

VI. ANALYSIS OF PLANT EFFLUENT FOR HEAVY METALS

Sewer samples were collected from each of six sewers leaving the WGK Plant. To obtain an overall picture of the metallic elements present in our effluent, the samples were analyzed by the emission spectroscopy method. This method of analysis was used to give only the order of magnitude for the concentration of each metal present in the sample. The samples were also analyzed by the atomic absorption method for mercury and other metallic elements for which the WGK laboratory is set up to run. The results of these analyses are tabulated in Table VI.

The issuance of this report completes the first part of the heavy metals into environment study as outlined in your referenced letter. The pollution control department at WGK will continue its analysis of potential metallic pollutants and related problem areas with a report of our progress being made by 12/31/70.

M. R. Foresman

pd
Attachments

CER 130540

TABLE I

COMPANY CONFIDENTIAL

PRODUCTS SOLD	METALLIC CONTENT	#/YEAR PRODUCED
S-203D	Ba-14%	5,549,000
M-5393	Ba-10%	3,470,000
S-393	Zn-9%	3,300,000
S-493	Zn-9%	2,500,000
S-593	Zn-9%	9,800,000
Vocol	Zn-12%	200,000
Santolube Blends		
S-205A	(Ba - 1% → 7.5%)	5,174,250
S-209	(Zn - 0.9% → 3.5%)	
S-693		
M-5223		
M-5418M		
M-5409		
S-680		
S-827A		
S-689		
M-5090		
M-5453		
M-5394D		
M-5413		
S-698		
M-5196		
S-817		
M-5455		
M-5464		
S-392		
M-5313		

CER 130541

TABLE I (continued)

PRODUCTS SOLD	METALLIC CONTENT	#/YEAR PRODUCED
Santolube Blends (contd.)		
M-5138C		
M-5196		
M-5385		
Chlorine Spent H_2SO_4	Hg - 0.54 PPM	4,428,000
66° H_2SO_4	As - 0.2 PPM Pb - 0.1 PPM Se - 2.0 PPM Hg - 0.01 PPM	104,160,000

CER 130542

TABLE II

RAW MATERIALS & INTERMEDIATES	METALLIC CONTENT	USAGE #/YEAR
Barium Carbonate	Ba 70%	571,388
Barium Oxide (Fines)	Ba 89%	448,814
Barium Oxide (Reg.)	Ba 89%	649,184
Zinc Oxide	Zn 80%	2,027,600
Oronite 260	Zn 5%	59,400
Magnesium Chloride	Mg 25%	112,680
Phosphorus	As 75 PPM	39,260,800
Mercury	Hg 100%	49,475
Cupric Sulfate	Cu 39%	100# (1970)
KOH	Hg 1.4 PPM	51,972,000
NaOH (70%)	Hg 0.14 PPM	139,608,000
NaOH (50%)	Hg 0.08 PPM	23,496,000
Chlorine	Hg 10.0 PPM	83,856,000
Hydrogen	Hg 22.0 PPM	2,314,000

TABLE III

COMPANY CONFIDENTIAL

PRODUCTS HAULED TO LANDFILL	METALLIC CONTENT	#/YEAR PRODUCT	#/YEAR METALLIC ELEMENT
Zinc Oxide Waste	Zn 80%	205,690	164,552 #Zn
S-393	Zn 9%	76,230	6,860 #Zn
S-493	Zn 9%	58,250	5,242 #Zn
S-593	Zn 9%	166,600	14,994 Zn
Vocol	Zn 12%	12,000	1,440 #Zn
P_2S_5	As 75 PPM	2,500	0.20 #As
Various Santolubes	Ba 5%) Zn 2%)	21,600	1,080 #Ba 432 #Zn
Cresylic Acid Still Residue	As 48 PPM	172,300	8.3 #As
Rototherm Residue	Mg 3.25%	848,400	27,573 #Mg
Recycle RM Purge	As 0.30 PPM	360,000	0.10 #As
Phosphorus Mud	As 2.3 PPM	2,400	.05 #As
P_2S_5 Residue	As 21 PPM	15,000	.31 #As
Santophen Still Residue	Ni 2 PPM	1,250,000	2.5 #Ni
S-203D (BABS)	Ba 14%	130,500	18,270 #Ba
M5393	Ba 10%	18,000	1,800 #Ba
Waste P_2S_5	As 75 PPM	1,200	.09 #As
Waste Material Lab Sec. #4	Ba 7%) Zn 3%)	12,600	882 #Ba 378 #Zn

CER 130544

TABLE IV

COMPANY CONFIDENTIAL

MATERIALS SEWERED	METALLIC CONTENT	#/YEAR	#/YEAR METALLIC ELEMENT
S-393	Zn 9%	14,520	1,307 #Zn
S-493	Zn 9%	11,500	1,035 #Zn
S-593	Zn 9%	38,220	3,439 #Zn
Zinc Oxide	Zn 80%	1,500	1,200 #Zn
Mixture S-393, 493, 593	Zn 9%	8,000	720 #Zn
Various Santolubes	Ba 5%) Zn 2%)	10,000	500 #Ba 200 #Zn
Barium Oxide (Fines & Reg.)	Ba 89%	1,000	890 #Ba
Barium Carbonate	Ba 70%	500	350 #Ba
Dept. 250 Effluent	As 1.3 PPM	1,123 #As	1,123 #As
Dept. 231 & 252 Effluent	Hg .15 PPM	12,000 #Hg	12,000 #Hg
Mixture S2030 & M5393	Ba 12%	35,600	4,272 #Ba
Control Instrument Mercury	Hg 100%	200 #Hg	200 #Hg

CER 130545

COMPANY CONFIDENTIAL

TABLE V

MERCURY VAPOR READINGS (mg/M^3)

August 11 - 20

SAMPLE POINT	8/11	8/12	8/13	8/14	8/17	8/18	8/19	8/20
1	.005	Nil	.005	.020	.005	.030	.060	.100
2	.010	Nil	Nil	.010	.015	.030	.070	.075
3	.010	.015	.005	.005	.015	.025	.030	.040
4	.005	.005	.010	.010	.010	.005	.010	.010
5	Nil	.005	.005	.010	.005	Nil	.010	.015
6	Nil	.005	Nil	.005	.005	.005	.005	.020
7	.005	Nil	.010	.020	.030	.010	.010	.030
8	.005	.010	.010	.010	.020	.015	.010	.020
9	Nil	Nil	Nil	.005	.005	.005	.005	.010
10	.010	.015	.015	.010	.020	.015	Nil	.025

Sample Point Locations are Shown in Figure I.

Threshold Limit for Hg Vapor - 0.1 Mg/M^3

THRESHOLD LIMIT VALUES - refer to air-borne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse effect.

CER 130546

TABLE VI

COMPANY CONFIDENTIAL

WGK PLANT EFFLUENT ANALYSIS (PPM)

ELEMENT	SAMPLE LOCATIONS					
	WEST + 262	24 W	EAST	30 W	254	H_2SO_4
Arsenic	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
Mercury	<0.01	0.16	<0.01	0.05	<0.01	<0.01
Copper	0.10	1.50	0.04	0.35	0.05	0.06
Lead	0.03	0.57	0.03	0.63	0.06	0.05
Cadnium	0.02	0.03	<0.01	0.02	<0.01	<0.01
Cyanide	<0.005	0.032	<0.005	<0.005	<0.005	<0.005
Phenolics	2	5	5	7	2	1

ELEMENTS DETECTED BY EMISSION SPECTROSCOPY (PPM)

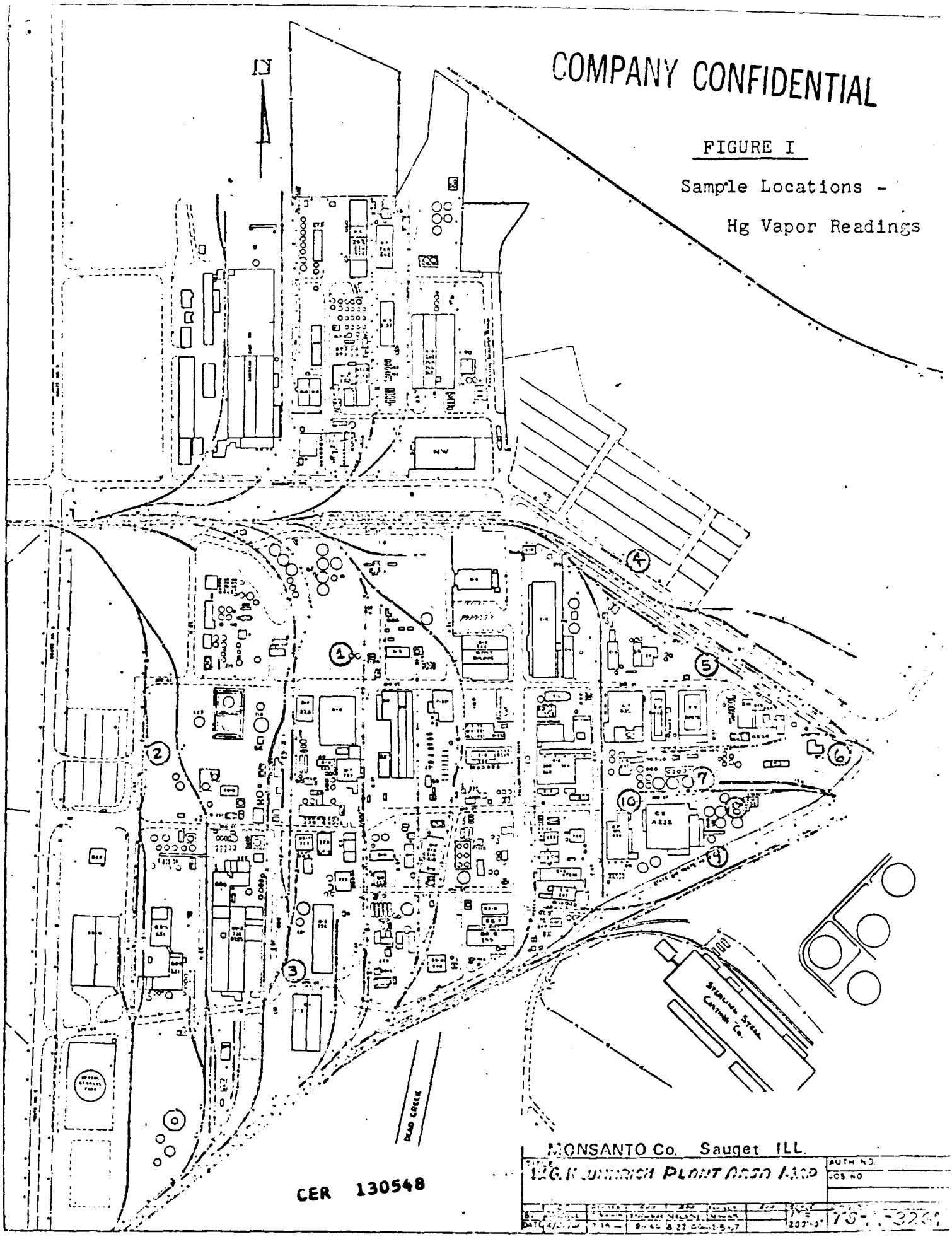
Barium	0.2-2.0	-	-	-	-	-
Boron	-	0.2	-	0.04	0.01	0.02
Silicon	10	20	5-50	20	0.5-5	8-80
Phosphorus	-	20	-	4	-	-
Manganese	1-10	2-20	5	2-20	.05-.5	0.1-1.0
Iron	10	20	-	2-20	0.5-5	1-10
Lead	0.2	.2	-	2	-	-
Chromium	-	0.4-4	-	0.4-4	-	1-10
Magnesium	10-100	20-200	-	20-200	5-50	8-80
Nickel	0.2-2.0	2-20	-	0.4-4	-	0.1-1
Aluminum	0.2-2.0	2-20	-	2-20	1	1-10
Calcium	100	20-200	>600	20-200	50	80
Copper	0.02-0.2	0.4-4	1	0.4-4	0.5	0.1-1
Zinc	1-10	-	-	-	-	-
Sodium	> 10	20-200	10	20	5-50	8-80
Potassium	-	-	-	4	-	-
Titanium	-			0.4-4		0.1-1

COMPANY CONFIDENTIAL

FIGURE I

Sample Locations -

Hg Vapor Readings



CER 130548